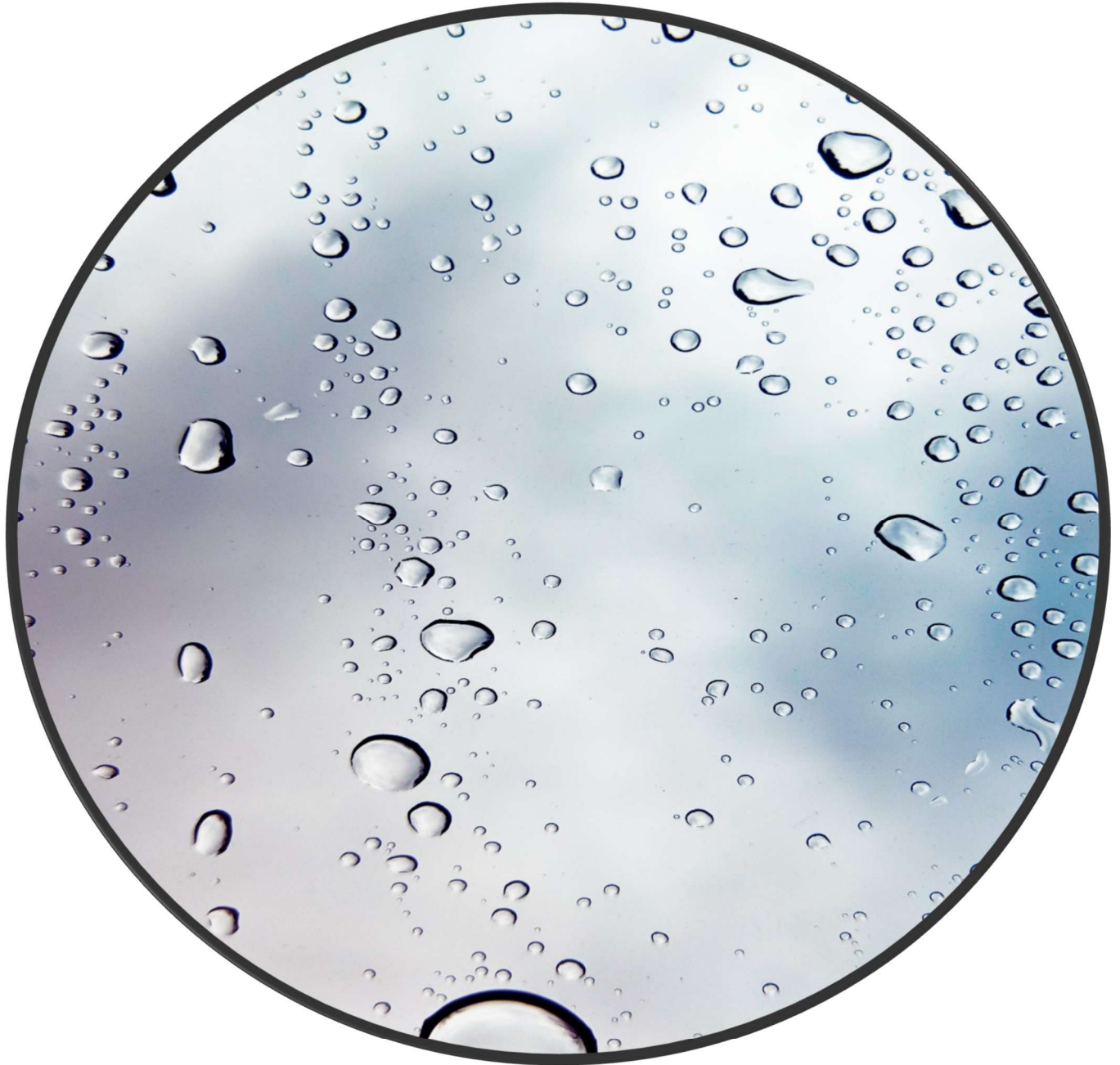




INFRASTRUCTURE DESIGN LTD
EST 2000

DRAINAGE STRATEGY REPORT,

DEVELOPMENT SITE LOCATED TO THE SOUTH OF HAMSLAND IN
HORSTED KEYNES, WEST SUSSEX
FORMER ST STEPHEN'S CHURCH
SEPTEMBER 2026
IDL/1334/DS/501



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DRAINAGE STRATEGY REPORT,

IDL/1334/DS/501

REPORT ISSUE

Revision	Date	Notes
P01	03/09/2026	Issue for planning

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APPENDIX A1 – SUDS HIERARCHY

APPENDIX A2 – SIMPLE INDEX TOOLS

APPENDIX B– PROPOSED DRAINAGE STRATEGY LAYOUT AND CONNECTION ARRANGEMENT

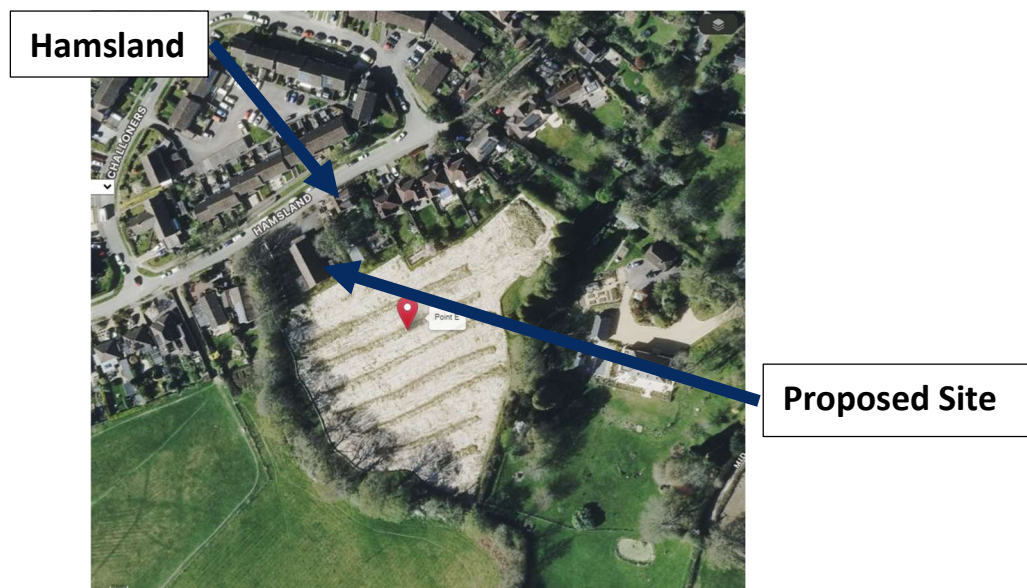
APPENDIX C – SURFACE WATER DRAINAGE CALCULATIONS

APPENDIX D – MANAGEMENT & MAINTENANCE REGIME

1 INTRODUCTION

- 1.1 RDP Construction has appointed Infrastructure Design Ltd (IDL) to prepare this Drainage Strategy Report in support of a full planning application for three new residential dwellings, with associated parking, landscaping and access, on the former St Stephen's Church site at Hamsland, Horsted Keynes. The application site is a brownfield parcel extending to approximately 0.09 ha. IDL has also been instructed by Macar Homes on the adjoining land to the south and is therefore familiar with the local ground conditions, existing drainage arrangements and established outfall connections serving the wider development.
- 1.2 This report has been prepared in accordance with national and local planning policy, with reference to CIRIA SuDS Manual C753, Environment Agency Rainfall Runoff Management for Developments, the Non-Statutory Technical Standards for SuDS and Building Regulations Approved Document H.
- 1.3 This report relates to the drainage strategy for the developed site. Construction-phase surface water management is addressed separately and should be implemented through the contractor's temporary works and construction management procedures.
- 1.4 The site is located to the south of Hamsland in Horsted Keynes, West Sussex, RH17 7DX, with access from Hamsland to the north. The site grid reference is TQ383279. Existing residential properties bound the site to the east, with the neighbouring residential development approved under planning reference DM/20/4692 located to the south and west.

Figure 1 – Site Location Plan



2 REFERENCE DOCUMENTS

- Drainage Strategy statement for Former St Stephen's Church, Hamsland, Horsted Keynes, dated June 2026.
- Southern Water wastewater asset plan and manhole schedule for the Hamsland area.
- Approved neighbouring Macar Homes drainage information for the 30-dwelling development south and west of the site.
- Topographical Survey prepared by Jas plan services Survey Solution dated June 2025.
- Previous FRA and Drainage Strategy information prepared for the adjoining Hamsland residential development.

- 2.1 Available topographic information indicates ground levels of approximately 92.5 m AOD at the northern Hamsland boundary and approximately 91.5 m AOD along the southern boundary, giving an average fall from north to south of approximately 1 in 32.
- 2.2 The proposed development comprises three residential dwellings on a brownfield site formerly occupied by St Stephen's Church and associated hardstanding. Existing impermeable areas equate to approximately 50–60% of the site area, with a small reduction proposed as part of the development.
- 2.3 Geological records indicate that the site is generally underlain by the Ashdown Formation, with the Upper Tunbridge Wells Sand Formation potentially present on adjoining land to the south. Both comprise interbedded sandstone and siltstone and are considered relatively impermeable. The site is also identified as being within a high groundwater vulnerability zone.
- 2.4 The proposed development comprises three residential dwellings with associated access, parking, private areas and drainage connections. The surface water drainage approach is to mirror the approved strategy for the adjoining Macar Homes scheme, but proportionate to the substantially smaller impermeable area associated with three dwellings.
- 2.5 The impermeable area associated with the three-dwelling scheme will be significantly smaller than the adjoining 30-dwelling drainage catchment. The latest impermeable area plan is included in Appendix B.

- 2.6 The site is within Flood Zone 1 and is assessed as being at low risk of fluvial flooding. The attached drainage statement also identifies low surface water and groundwater flood risk, with no increased off-site flood risk arising from the proposed development.
- 2.7 The closest watercourse is located to the south-west of the neighbouring development site and ultimately forms part of a ditch network discharging towards Danehill Brook. The surface water strategy for this small site is to manage runoff through treatment and attenuation before discharge to the neighbouring approved drainage infrastructure and shared outfall route.
- 2.8 The three-dwelling surface water drainage will be kept separate from foul water and will discharge by gravity to the designed/as-built surface water drainage system serving the adjoining 30-house Macar Homes scheme. The 30-house scheme is currently under construction, and its drainage infrastructure provides the downstream attenuation, flow-control and outfall route.
- 2.9 The discharged Condition 6 addendum confirms that the approved adjoining scheme uses a SuDS-led approach including permeable paving, cellular storage, Hydrobrake controls and exceedance routing, and that the revised surface water arrangement remains consistent with the approved drainage principles.
- 2.10 The three-house scheme will not introduce a new independent surface water outfall. Runoff will be connected into the downstream drainage system serving the 30-house development, with the same ultimate outfall used for the adjoining site.
- 2.11 The existing approved drainage principles therefore remain applicable, subject to confirming that the additional runoff from the three dwellings is included within the detailed hydraulic assessment of the receiving 30-house drainage network and that no adverse impact occurs on downstream capacity, exceedance routing or water quality treatment.
- 2.12 The approved 30-dwelling drainage model was updated using FEH2022 rainfall data, a runoff coefficient of 1.0 and appropriate climate change allowances, with the principal surface water discharge controlled to 3.0 l/s through Hydrobrake flow controls. The three-dwelling scheme will include local control manholes and attenuation storage before discharging to the adjoining surface water network at a restricted rate of 1.0 l/s, subject to

detailed hydraulic verification. The design should confirm that the receiving network has sufficient capacity and that flood risk is not increased on or off site.

- 2.13 The strategy for the three-house scheme is therefore to provide local collection and conveyance, incorporating suitable source-control measures where practicable, before discharging to the designed/as-built surface water sewer system serving the adjoining 30-house development. The receiving network and outfall arrangement should be verified against the latest construction/as-built records. This approach has been agreed with the adjoining developer, Macar Homes, who have confirmed that the proposed connection is acceptable within their established drainage system.
- 2.14 The drainage design should be read together with the previous FRA and Drainage Strategy prepared by JNP Group, the IDL addendum to the approved Condition 6 drainage strategy, the latest IDL construction/as-built drainage drawings for the 30-house scheme, and any updated hydraulic calculations prepared for the three-dwelling catchment.
- 2.15 On this basis, the three-house drainage strategy is considered to be a proportionate extension of the approved drainage approach for the adjoining Macar Homes scheme, provided the final detailed design confirms hydraulic capacity, safe exceedance routing and maintenance responsibilities.

3 SURFACE WATER DRAINAGE & SUDS

- 3.1 The surface water drainage strategy has been reviewed against the applicable planning requirements, including the National Planning Policy Framework, national SuDS standards, the Non-Statutory Technical Standards for SuDS, CIRIA C753 and West Sussex County Council Lead Local Flood Authority guidance. The strategy demonstrates that surface water runoff can be managed sustainably, without increasing flood risk elsewhere, and with appropriate long-term maintenance arrangements.
- 3.2 The SuDS discharge hierarchy has been considered. Rainwater reuse and infiltration are not proposed as the primary disposal method due to the small scale of the development, site layout constraints and limited infiltration potential identified through previous ground investigation information. The preferred approach is attenuation with restricted discharge to the adjoining approved surface water drainage network.

- 3.3 The final detailed design should confirm the pre- and post-development impermeable areas, urban creep allowance where applicable, storage volumes, restricted discharge rate, exceedance routes, water quality treatment and maintenance responsibilities. These items should be cross-referenced to the drainage drawings, hydraulic calculations and maintenance schedule submitted with the planning application or secured by planning condition.
- 3.4 The surface water strategy has been developed for a minor three-dwelling brownfield scheme. The site includes the former St Stephen's Church and associated hardstanding, with existing impermeable coverage of approximately 50–60% and a small reduction proposed.
- 3.5 The existing surface water drainage disposal arrangement on the former church site is unknown. The proposed development will provide a betterment by introducing defined drainage collection, treatment and attenuation prior to discharge.
- 3.6 Infiltration testing on the neighbouring development provided a strong indication that shallow infiltration is unlikely to be acceptable, although deep bore soakaways may be feasible. However, given the available data and site characteristics, the preferred strategy is attenuation and discharge to the neighbouring drainage/outfall arrangement.
- 3.7 Surface water runoff from roofs and hardstanding will be collected and managed by on-site treatment and attenuation. The proposed discharge will be to the designed/as-built drainage system for the adjoining Macar Homes 30-dwelling development, which is currently under construction, and then to the same final surface water outfall serving that scheme and the applicant has agreed this with Macar Homes.
- 3.8 Attenuation may be provided through permeable paving, geo-cellular storage, or a combination of both. Permeable paving will provide interception, runoff delay and treatment for driveway and parking areas in accordance with the SuDS Manual principles.
- 3.9 As the development is minor and the impermeable area is limited, very low discharge rates should be treated with caution. The drainage statement notes that discharge rates below 2 l/s are commonly difficult to control reliably. The final discharge rate should therefore be agreed through the detailed design and/or planning condition process.
- 3.10 The receiving 30-dwelling drainage system includes attenuation, conveyance, flow control and downstream outfall arrangements. The proposed three-dwelling connection should be

coordinated with the latest construction/as-built drainage records and checked to confirm no increase in flood risk on or off the site.

- 3.11 The final design should confirm that the additional three-house runoff can be accommodated without increasing the agreed discharge rate from the adjoining site and without increasing flood risk on-site or off-site.
- 3.12 The approved addendum confirms a controlled surface water discharge rate of 3.0 l/s for the adjoining 30-house scheme using Hydrobrake control chambers and cellular storage. The three-house scheme should be incorporated into the hydraulic model and checked against the same receiving outfall constraint.
- 3.13 SuDS components for the three-house scheme should be proportionate to its scale and may include permeable paving to private drives/parking areas, catchpits or silt traps upstream of the connecting sewer, trapped gullies or channel drains where required, and local attenuation if demonstrated necessary by the updated hydraulic assessment.
- 3.14 Where permeable paving is used, it should be lined where required and connected to the drainage system so runoff is conveyed to the approved 30-house drainage network rather than relying on infiltration.
- 3.15 Runoff from roofs, access and parking areas will receive appropriate treatment before entering the receiving drainage system. The previous FRA identifies residential roofs as very low pollution hazard and residential driveways/low traffic roads as low pollution hazard under the CIRIA Simple Index Approach.
- 3.16 The downstream drainage strategy includes water quality treatment through SuDS and filter-drain components within the SDS cellular system. The mitigation indices exceed the relevant pollution hazard indices for total suspended solids, metals and hydrocarbons, and the three-dwelling connection should not bypass the required treatment train.
- 3.17 To summarise, the following SuDS and drainage measures are applicable to the three-house scheme:
- **Permeable paving** – To private drives and/or parking areas where practicable, providing source control, runoff delay and initial water quality treatment.
 - **Catchpits and channel drains** – To collect runoff, intercept silt and debris and protect the downstream drainage network during operation.

- **Connection to the 30-house drainage system** – To convey the three-house runoff to the already designed/as-built attenuation, flow-control and outfall arrangement serving the adjoining Macar Homes scheme.

- 3.18 The drainage model should be updated to include the additional impermeable area and inflow from the three dwellings. The design should demonstrate no flooding for the relevant 1 in 30-year and 1 in 100-year plus climate change events and should confirm that the final outfall discharge remains consistent with the approved adjoining strategy.
- 3.19 The surface water calculations should be prepared using the current FEH rainfall data, a runoff coefficient appropriate to impermeable areas, and the latest Environment Agency climate change allowances. The approved addendum used FEH2022 rainfall data and considered 1 in 100-year plus climate change events.
- 3.20 Exceedance flow routes should be reviewed to ensure that flows from the three-house scheme are directed away from dwellings and towards safe routes that connect with the adjoining approved exceedance strategy for the 30-house development.
- 3.21 The three-house scheme represents a minor additional residential catchment when compared with the adjoining 30-house drainage network. Subject to updated calculations confirming capacity and no increase in downstream risk, the proposed connection is considered consistent with the approved drainage strategy.

4 HYDRAULIC MODELLING AND CLIMATE CHANGE ALLOWANCE

- 4.1 Hydraulic modelling has been updated using FEH2022 rainfall data, which represents an improvement over the datasets used in the original strategy.
- 4.2 All critical durations, including the 1 in 100-year + 45% climate change event, have been tested.
- 4.3 The drainage network demonstrates zero flooding during all modelled storm events.
- 4.4 These outcomes confirm compliance with LLFA expectations for resilience under future climate change. Refer to Appendix C for the surface water drainage calculations.

5 EXCEEDANCE STRATEGY

- 5.1 The scheme includes defined exceedance flow paths, shown on the drainage drawings, enabling safe conveyance of surface water during extreme rainfall or blockage conditions. This ensures flows are routed away from vulnerable areas and aligns with LLFA requirements for overland exceedance planning. Refer to Appendix B for the drainage plans and levels drawings.

6 WATER QUALITY MANAGEMENT

- 6.1 The suitability of the proposed drainage strategy to manage the development's pollution risk has been assessed using the Simple Index Approach set out in *The SuDS Manual (CIRIA C753, 2015)*. This method compares the pollution-hazard indices associated with each site activity with the mitigation indices provided by the proposed SuDS components. A summary is provided in Figure 2

Figure 2: Surface Water Quality Management (Simple Index Approach)

Simple Index Approach – Runoff Route / Treatment Train 1					
Land Use / SuDS		Hazard Level	TSS	Metals	Hydrocarbons
Pollution Hazard Indices					
Roofing		Very Low	0.2	0.2	0.05
SuDS Mitigation Indices					
SuDS Component			TSS	Metals	Hydrocarbons
Filter drain within the SDS system		Sufficient	0.5	0.5	0.5
Pollution Hazard Indices					
Parking bays.		Low	0.5	0.4	0.4
SuDS Mitigation Indices					
SuDS Component			TSS	Metals	Hydrocarbons
Filter drain within the SDS system		Sufficient	0.5	0.5	0.5

- 6.2 The mitigation indices provided by the proposed SuDS treatment train exceed the pollution hazard indices for all relevant contaminants, including total suspended solids, metals and hydrocarbons. Accordingly:
- The treatment train provides adequate pollutant removal for all identified run-off sources.
 - The system is fully compliant with the Simple Index Approach requirements in *The SuDS Manual (2015)*.

- Water quality treatment is appropriately matched to the pollution hazard level of each contributing area, ensuring protection of downstream receiving waters.

6.3 This confirms that the proposed drainage strategy delivers a robust, compliant water-quality management solution.

7 CONSTRUCTION-PHASE SURFACE WATER MANAGEMENT

7.1 A Surface Water Management Plan (SWMP) has been considered to address construction-phase risks. The following measures will be implemented during the construction:

- Manage temporary drainage
- Control sediment and pollutants
- Protect receiving watercourses

7.2 These measures ensures compliant water management during site preparation and construction.

8 MAINTENANCE AND LIFETIME MANAGEMENT

8.1 A comprehensive Maintenance and Management Plan is provided (Appendix D), setting out:

- Inspection intervals
- Operational responsibilities
- Long-term maintenance actions for SuDS and drainage infrastructure

9 FOUL WATER DRAINAGE

9.1 A Southern Water public foul sewer flows east to west along Hamsland. The sewer record identifies the sewer in the proximity of the site as being approximately 1.8 m below ground level, with an invert level in the order of 90.40 m AOD.

9.2 The existing Hamsland access level is approximately 92.5 m AOD and the site falls gently southwards. Subject to detailed design of finished floor levels, cover levels and drainage gradients, foul water from the three dwellings can discharge by gravity to the foul drainage

system serving the adjoining 30-dwelling scheme. The proposed connection should be confirmed with Southern Water and any required statutory approvals obtained before construction.

10 CONCLUSION

- 10.1 The proposed development is a minor three-dwelling brownfield scheme on the former St Stephen's Church site. The site is in Flood Zone 1 and is assessed as being at low risk from the principal sources of flooding.
- 10.2 The proposed development will reduce or broadly maintain the existing brownfield impermeable area and will introduce formal surface water collection, attenuation, treatment and maintenance arrangements.
- 10.3 Surface water runoff will be managed on site using permeable paving and/or geo-cellular attenuation before discharge to the designed/as-built drainage system for the adjoining Macar Homes 30-dwelling development, its shared final outfall and this has been agreed with Macar Homes.
- 10.4 The final discharge rate and storage volume should be confirmed at detailed design stage. Given the minor scale of the development, a discharge rate below 2 l/s may not be practical to control reliably and should be agreed with the approving authority.
- 10.5 Infiltration has not been relied upon as the primary method of surface water disposal because the previous FRA identifies limited infiltration potential and supports an attenuation-led strategy with controlled discharge.
- 10.6 SuDS measures should be proportionate to the three-house scheme and may include permeable paving, trapped gullies, catchpits/silt traps and local attenuation where required before connection to the adjoining drainage network.
- 10.7 The surface water calculations should be checked using current FEH rainfall data, a suitable impermeable runoff coefficient and current climate change allowances, consistent with the approved addendum methodology.
- 10.8 Maintenance of private on-plot drainage features, including permeable paving and any private drainage connections, will be the responsibility of the respective homeowners and should be identified within the homeowner information pack. Any shared drainage

elements serving more than one dwelling should be maintained through an agreed management arrangement.

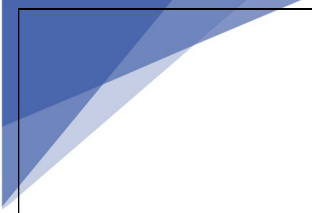
- 10.9 Subject to detailed design, confirmation of hydraulic capacity, agreement of the final discharge and connection arrangements, and receipt of any required statutory approvals, there are no identified flood risk or drainage reasons why planning permission cannot be granted for the proposed three-dwelling development.

11 ENCLOSURES

- 5.1 Appendix A1 includes the SuDS Hierarchy.
- 5.2 Appendix A2 includes water quality treatment and Simple Index commentary.
- 5.5 Appendix B includes a copy of the Drainage Strategy Layouts and connection agreement.
- 5.6 Appendix C Surface Water drainage calculation.
- 5.7 Appendix D includes the management and maintenance regime for the private drainage assets.

APPENDIX A1 – SUDS HIERARCHY

Most Sustainable	SUDS technique	Flood Reduction	Pollution Reduction	Landscape & Wildlife Benefit	Included in the scheme?	Comments
	Living roofs	✓	✓	✓		Not proposed for the three-house scheme due to the small scale of development and standard roof construction.
	Basins and ponds	✓	✓	✓		Not proposed. The small three-house scheme will connect to the 30-house drainage network, which provides downstream attenuation and controlled discharge.
	Filter strips and swales	✓	✓	✓		Not proposed due to site density and limited space for these SuDS features.
	Infiltration devices	✓	✓	✓		Not proposed as the primary drainage method. The previous FRA identifies limited infiltration potential, and the strategy is to discharge to the 30-house drainage network.
	Permeable surfaces and infiltration blanket	✓	✓		✓	Permeable paving is proposed where practicable. This will assist in reducing pollution and delaying runoff before discharge to the drainage network.
Least Sustainable	Tanked systems-Over size Pipes	✓			✓	Cellular storage tanks with filter drains are proposed to attenuate extreme storm events and manage surface water runoff.



APPENDIX A2 – SIMPLE INDEX TOOLS

SIMPLE INDEX APPROACH: TOOL



HRW shall not be liable for any direct or indirect damage claims, loss, cost, expense or liability whatsoever arising out of the use or impossibility to use the tool, even when HRW has been informed of the possibility of the same. The user hereby indemnifies HRW from and against any damage claim, loss, expense or liability resulting from any action taken against HRW that is related in any way to the use of the tool or any reliance made in respect of the output of such use by any person whatsoever. HRW does not guarantee that the tool's functions meet the requirements of any person, nor that the tool is free from errors.

- The steps set out in the tool should be applied for each inflow or 'runoff' area (ie each impermeable surface area separately discharging to a SuDS component).
- The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.
- Relevant design examples are included in the SuDS Manual Appendix C.
- Each of the steps below are part of the process set out in the flowchart on Sheet 3.
- Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.

DROP DOWN LIST	RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP
USER ENTRY	USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL.

STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme

This step requires the user to select the appropriate land use type for the area from which the runoff is occurring

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index
- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

Runoff Area Land Use Description		Hazard Level	Pollution Hazard Indices		
			Total Suspended Solids	Metals	Hydrocarbons
Select land use type from the drop down list (or 'Other' if none applicable):					
Residential roofing		Very low	0.2	0.2	0.05
Landuse Pollution Hazard Index		Very low	0.2	0.2	0.05

STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components

This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface water body or downstream infiltration component

If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generically described by the suggested components, then 'Proprietary treatment system' or 'User defined indices' should be selected and a description of the component and agreed user defined indices should be entered in the rows below the drop down lists

SuDS Component Description		Pollution Mitigation Indices		
		Total Suspended Solids	Metals	Hydrocarbons
Select SuDS Component 1 (i.e. the upstream SuDS component from the drop down list):	None			
Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list:	None			
Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list:	None			
If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:				
Aggregated Surface Water Pollution Mitigation Index		0	0	0

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Note: If the total aggregated mitigation index is >= 1 (which is not a realistic outcome), then the outcome is fixed at <0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, the outcome would need more detailed verification).

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at "<0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

Is the runoff now discharged to an infiltration component?

Yes ? [Go to Step 2B](#)
No ? [Go to Step 2C](#)

STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection

This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and risks to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generically described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down list

	Pollution Mitigation Indices					
	Total Suspended Solids	Metals	Hydrocarbons	1	2	3
Select type of groundwater protection from the drop down list: →						
	None					
If the proposed groundwater protection is biopore/aerogarden and/or the general indices above are not considered appropriate, select 'Respiratory product' or 'User defined indices' and enter a description of the protection and agreed user defined indices in this row:						
	Filter Chain integrated in SuDS systems	0.5	0.5	0.5		
Groundwater Protection Pollution Mitigation Index		0.5	0.5	0.5		

STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area

This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices

Combined Pollution Mitigation Indices for the Runoff Area	Combined Pollution Mitigation Indices		
	Total Suspended Solids	Metals	Hydrocarbons
	0.5	0.5	0.5

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at "<0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components

This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type

When the combined mitigation index exceeds the land use pollution hazard index, then the proposed components are considered sufficient in providing pollution risk mitigation.

In England and Wales, where the discharge is to protected surface waters or groundwater (an additional treatment component (ie near and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as Source Protection Zone 1. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator on a site by site basis.

Sufficiency of Pollution Mitigation Indices	Sufficiency of Pollution Mitigation Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Sufficient	Sufficient	Sufficient	Sufficient

DESIGN CONDITIONS

Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England.

SIMPLE INDEX APPROACH: TOOL



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- The steps set out in the tool should be applied for each inflow or 'runoff area' (ie each impermeable surface area separately discharging to a SuDS component).
- The supporting 'Design Conditions' stated by the tool must be fully considered and implemented in all cases.
- Relevant design examples are included in the SuDS Manual Appendix C.
- Each of the steps below are part of the process set out in the flowchart on Sheet 3.

5. Sheet 4 summarises the selections made below and indicates the acceptability of the proposed SuDS components.

DROP DOWN LIST	RELEVANT INPUTS NEED TO BE SELECTED FROM THESE LISTS, FOR EACH STEP
USER ENTRY	USER ENTRY CELLS ARE ONLY REQUIRED WHERE INDICATED BY THE TOOL.

STEP 1: Determine the Pollution Hazard Index for the runoff area discharging to the proposed SuDS scheme

This step requires the user to select the appropriate land use type for the area from which the runoff is occurring

If the land use varies across the 'runoff area', either:

- use the land use type with the highest Pollution Hazard Index
- apply the approach for each of the land use types to determine whether the proposed SuDS design is sufficient for all. If it is not, consider collecting more hazardous runoff separately and providing additional treatment.

If the generic land use types suggested are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in the row below the drop down lists.

Runoff Area Land Use Description	Hazard Level	Pollution Hazard Indices		
		1 use suspended Solids	Metals	Hydrocarbons
Select land use type from the drop down list (or 'Other' if none applicable):				
Low traffic roads (e.g. residential roads and general access roads, < 300 traffic movements/day)	Low	0.5	0.4	0.4
If the generic land use types in the drop down list above are not applicable, select 'Other' and enter a description of the land use of the runoff area and agreed user defined indices in this row:				
Landuse Pollution Hazard Index	Low	0.5	0.4	0.4

DESIGN CONDITIONS	
1	2

STEP 2A: Determine the Pollution Mitigation Index for the proposed SuDS components

This step requires the user to select the proposed SuDS components that will be used to treat runoff - before it is discharged to a receiving surface waterbody or downstream infiltration component

If the runoff is discharged directly to an infiltration component, without upstream treatment, select 'None' for each of the 3 SuDS components and move to Step 2B

This step should be applied to evaluate the water quality protection provided by proposed SuDS components for discharges to receiving surface waters or downstream infiltration components (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

If you have fewer than 3 components, select 'None' for the components that are not required

If the proposed component is bespoke and/or a proprietary treatment product and not generically described by the suggested components, then 'Proprietary treatment system' or 'User defined indices' should be selected and a description of the component and agreed user defined indices should be entered in the rows below the drop down lists

SuDS Component Description	Pollution Mitigation Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Select SuDS Component 1 (i.e. the upstream SuDS component) from the drop down list:			
None			
Select SuDS Component 2 (i.e. the second SuDS component in a series) from the drop down list:			
None			
Select SuDS Component 3 (i.e. the third SuDS component in a series) from the drop down list:			
None			
If the proposed SuDS components are bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary treatment system' or 'User defined indices' and enter component descriptions and agreed user defined indices in these rows:			
Aggregated Surface Water Pollution Mitigation Index	0	0	0

DESIGN CONDITIONS		
1	2	3

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at "0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

Is the runoff now discharged to an infiltration component?

Yes ? [Go to Step 2B](#)
No ? [Go to Step 2C](#)

STEP 2B: Determine the Pollution Mitigation Index for the proposed Groundwater Protection

This step requires the user to select the type of groundwater protection that is either part of the SuDS component or that lies between the component and the groundwater

This step should be applied where a SuDS component is specifically designed to infiltrate runoff (note: in England and Wales this will include components that allow any amount of infiltration, however small, even where infiltration is not specifically accounted for in the design).

'Groundwater protection' describes the proposed depth of soil or other material through which runoff will flow between the runoff surface and the underlying groundwater.

Where the discharge is to surface waters and risks to groundwater need not be considered, select 'None'

If the proposed groundwater protection is bespoke and/or a proprietary product and not generically described by the suggested measures, then a description of the protection and agreed user defined indices should be entered in the row below the drop down list

Select type of groundwater protection from the drop down list:	Pollution Mitigation Indices		
	Total Suspended Solids	Metals	Hydrocarbons
Proprietary product			
Enter User Defined Indices in row below			
If the proposed groundwater protection is bespoke/proprietary and/or the generic indices above are not considered appropriate, select 'Proprietary product' or 'User defined indices' and enter a description of the protection and agreed user defined indices in this row:			
Filter Drain integrated in SuDS system	0.5	0.5	0.5
Groundwater Protection Pollution Mitigation Index	0.5	0.5	0.5

DESIGN CONDITIONS			
1	2	3	4
Detailed assessment of performance of designed component in reducing inflow concentrations of each pollutant type required as evidence of adopted indices. Enter indices agreed by the environmental regulator in appropriate 'User Defined Indices' row below	All designs must include a minimum of 1 m unsaturated depth of subsoil or aquifer material between the infiltration surface and the maximum likely groundwater level. Infiltration components should always be provided by upstream components that trap silt, or designed specifically to retain sediment in a separate third zone, easily accessible for maintenance, such that the sediment will not be re-suspended in subsequent events	SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. HST-FRM-GS (SEPA, 2014) also provides a flow chart with a summary of checks on suitability of a proprietary system	See Chapter 15 Proprietary treatment systems for approaches to demonstrate product performance. Note: a British Water Environment Agency assessment Code of Practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: http://www.britishtwater.co.uk/Publications/code-of-practice.aspx

STEP 2C: Determine the Combined Pollution Mitigation Indices for the Runoff Area

This is an automatic step which combines the proposed SuDS Pollution Mitigation Indices with any Groundwater Protection Pollution Mitigation Indices

Combined Pollution Mitigation Indices	
Total Suspended Solids	Metals
0.5	0.5
0.5	0.5
0.5	0.5

Note: If the total aggregated mitigation index is > 1 (which is not a realistic outcome), then the outcome is fixed at "0.95". In this scenario, the proposed components are likely to have a very high mitigation potential for reducing pollutant levels in the runoff and should be sufficient for any proposed land use (note: where risk assessment is required, this outcome would need more detailed verification).

STEP 2D: Determine Sufficiency of Pollution Mitigation Indices for Selected SuDS Components

This is an automatic step which compares the Combined Pollution Mitigation Indices with the Land Use Hazard Indices, to determine whether the proposed components are sufficient to manage each pollutant category type

When the combined mitigation index exceeds the land use pollution hazard index, then the proposed components are considered sufficient in providing pollution risk mitigation.

In England and Wales, where the discharge is to protected surface waters or groundwater (an additional treatment component (ie near and above that required for standard discharges), or other equivalent protection, is required that provides environmental protection in the event of an unexpected pollution event or poor system performance. Protected surface waters are those designated for drinking water abstraction. In England and Wales, protected groundwater resources are defined as Source Protection Zone 1. In Northern Ireland, a more precautionary approach may be required and this should be checked with the environmental regulator on a site by site basis.

Sufficiency of Pollution Mitigation Indices	
Total Suspended Solids	Metals
Sufficient	Sufficient
Sufficient	Sufficient
Sufficient	Sufficient

DESIGN CONDITIONS	
1	Reference to local planning documents should also be made to identify any additional protection required for sites due to habitat conservation (see Chapter 7 The SuDS design process). The implications of developments on or within close proximity to an area with an environmental designation, such as a Site of Special Scientific Interest (SSSI), should be considered via consultation with relevant conservation bodies such as Natural England



APPENDIX B— PROPOSED DRAINAGE STRATEGY LAYOUT AND CONNECTION ARRANGEMENT

CONTRACT DOCUMENT

Notes

P1 Preliminary Issue 03.09.26

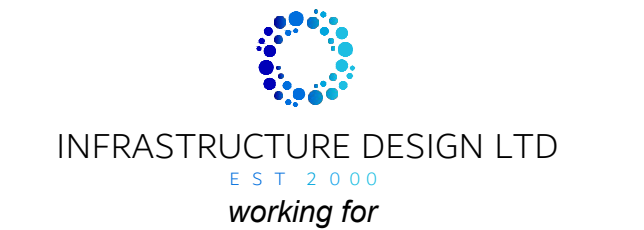
Rev Description Date

Status:

Preliminary Issue			
Scale: 1:250@A1			
Date:	Sep 2026	Checked:	Approved:
Drawn:	IDL	BM	PT

Drainage Area Plan

Project:
St Stephens Church, Horsted Keynes
Drg. No: IDL/1334/07/502
Rev: P1
File Ref: 1334-07
Plot Ref: 1334-07-502
Suite 44
Harborough Innovation Centre
Airfield Business Park, Leicester Road
Market Harborough, Leicestershire, LE16 7WB
Tel: 01858 411570
Email: info@infrades.co.uk URL: www.infrades.co.uk



RDP Construction Ltd



CONTRACT DOCUMENT

Notes

- This drawing is to be read in conjunction with the private drainage construction details IDL/1334/071 series and all other relevant contract documents.
- All private drainage works to be carried out in accordance with the provisions laid down in BS EN 944 & The Building Regulations, Part H.
- Levels shown in buildings are Finished Floor Level.
- Before commencing any Sewer or drainage works, the Developer's Groundworker must satisfy themselves, the Builder and the Local Authority of actual levels and conditions of existing sewers.
- Surf concrete to satisfy the requirements of BRE Special Digest 1 as predetermined by the site's Geotechnical Report.
- Depth and Location of existing services to be traced prior to any excavation.
- All private drainage to be laid to levels shown using flexibly jointed pipes, either uPVC to BS 4660 and BS 5481 or vitrified clayware to BS EN 295.
- Generally pipes to have granular Bed & Surround in accordance with manufacturers recommendations, ensuring adequate protection with respect to depth and location. Where bedding material is placed at depths susceptible to ground water ingress, it is to be draped in a geotextile (Tensar 700 or better).
- Private precast concrete manholes and catchpits to be constructed using conc. box sections or circular rings to BS 5911-200, with 150mm conc. surround, size and construction to comply with Table 12 of Approved Document, Part H.
- Rodding eyes, etc are to be laid to manufacturers minimum cover and depth to allow adequate fall from adjoining unit.
- Access panels are to be provided to all rainwater pipes, a max. 600 above finished ground level.
- All manholes / inspection chambers in hard surfaced areas, to have recessed covers. These are to be orientated such as to minimise cut blocks.
- All pipework to be 100mmØ unless otherwise stated, 150mm dia from road gullies.
- All levels in metres (m) unless specified otherwise.
- Upon completion of all underground drainage works, the groundworker is to provide a written report and CCTV record of the as built foul and surface water drainage systems installed.
- All drain runs from SVP's, stub stacks or FW gullies to be laid at min. 1:40 gradient unless otherwise stated.
- SVP's, stub stacks & RWPs are shown indicative only. Refer to Architectural dimensioned GAs for accurate locations.
- External drainage to be laid prior to erection of scaffold.
- All cover and invert levels shown are in metres. All pipe diameters are in millimetres U.N.O.
- IMPORTANT NOTE:**
At depths where groundwater ingress is encountered, consider the use of a sump / pump arrangement.
Where excavations are >1m deep, consider the use of full perimeter trench support.
- IMPORTANT NOTE:**
The new sewer connections are to be successfully made prior to commencing any upstream drainage works.
- IMPORTANT NOTE:**
Upon completion of all underground drainage works, the groundworker is to provide a written report and CCTV record of the as built foul and surface water drainage systems installed.

P1 Preliminary Issue 03.09.26

Rev	Description	Date
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Status: Preliminary Issue

	Scale: 1:250@A1	Checked:	Approved:
	Date: Sep 26	BM	PT
	Drawn: IDL		

Title: Private Drainage Layout

Project: St Stephens Church, Horsted Keynes

Dwg. No:	Rev:	File Ref:	1334-07
IDL/1334/07/501	P1	Plot Ref:	1334-07-501

Suite 44
Harborough Innovation Centre
Airfield Business Park, Leicester Road
Market Harborough, Leicestershire, LE16 7WB
Tel: 01858 411570
Email: info@infrades.co.uk URL: www.infrades.co.uk

INFRASTRUCTURE DESIGN LTD
EST 2000
working for

RDP Construction Ltd

Key

- Private foul water drainage
- Private foul water rising main
- Private surface water drainage
- Denotes extent of below-ground drainage to benefit from a root barrier system. To be confirmed for Construction Issue
- Patio Drain - Land drainage to soft areas. 100 dia perforated pipe, lined with a geotextile sock and having 150mm pea-shingle bed and surround
- Land drainage to soft areas. 100 dia perforated pipe, lined with a geotextile sock and having 150mm pea-shingle bed and surround
- Polypropylene universal inspection chambers 1200 deep max, 450 dia, 100 inlet / outlet connections (6 no. max) or 150 inlet/outlet connections (4 no. max) as detailed on private drainage construction details
- Polypropylene 'non-entry' inspection chambers 3000 deep max, 450 dia (with 300 dia. or square cover) 100 inlet / outlet connections (6 no. max), or 150 inlet/outlet connections (4 no. max) as detailed on private drainage construction details
- Denotes 250 dia ppc, 600mm deep with 4 no. max 100 dia inlets / outlets, as detailed on IDL drainage construction details. IMPORTANT NOTE: Should the depth to invert exceed 600mm, a 450mm dia IC **MUST** be used.
- Denotes 500/600 dia ppc, 3000mm deep max with 4 no. max inlets / outlets up to 150mm dia, as detailed on private drainage construction details. Where >1200mm deep, use reduced size access cover. Wavin Range 500/600 or similar.
- Denotes 450 dia polypropylene silt trap with 300mm nominal sump, as messrs Polytype Basic Silt Trap or similar.
- Rodding eye same dia. as downstream drain
- 900 deep gully (trapped) with 150 outlet.
- Denotes 700x700x150mm distribution tank by Formpave or similar approved
- Proposed Headwall
- Proposed finished floor level
- Slotted linear drainage channel with sump unit and outlet to drainage system, as messrs ACO or similar approved. Grating type as specified by Macar Homes.
- Threshold drainage channel with sump unit and outlet to drainage system, as messrs ACO or similar approved. Grating type as specified by Macar Homes.
- Refer to surfacing layout plans, 1334/06/** for extent of permeable paving
- Parking spaces and drives in Permeable Block Paving wrapped with impermeable membrane
- Exceedance flood flow path



Mr Ronnie Martin
Suite 44
HIC
Airfield Business Park
Leicester Road
Market Harborough
Leicestershire
LE16 7WB

Your ref
23612

Our ref
DSA000049910

Date
29 January 2026

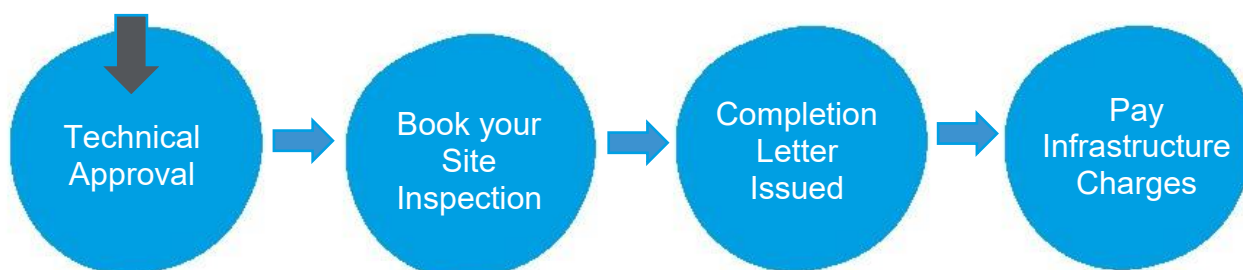
Contact
Tel: 07460 644246

Dear Mr Martin,

Application to Connect to the Public Sewerage System - Section 106.

Location: Land South of St Stephens Church, Hamsland, Horsted Keynes, West Sussex, RH17 7DS.

You are here



What happens next?

1. This is your technical approval.
2. Construction of the wastewater connection begins. Once completed, ensure you book a site inspection, so we know the connection is in line with your application.
3. Once the site inspection has confirmed the work is satisfactory, a completion letter will be issued. See the Essential Sewer Connection Information document to find out why this letter is important.
4. Your infrastructure charge invoice will be issued (if applicable*).

How to book your site Inspection

To progress, select the '**Accept**' option on the Get Connected customer dashboard. Or, if you have further questions, please select the 'Query' option. If you do not wish to progress with the application, then please select the 'Withdraw' option.

Now you have received our approval, you will need to arrange with your contractor to carry out your works on site to connect into our sewer. Once the connection has been made it is a mandatory requirement for the point of connection to be inspected by one of our Assistant Adoption Managers.

To arrange this inspection, please select '**Ready for Inspection**' on your Get Connected customer dashboard. Once this has been selected, please contact **Malcolm Penny**, our Assistant Adoption Manager for this area on **07922 860784**, and request an inspection giving at least two full working days' notice.

Once we are happy that your connection to the public sewer complies with our requirements and have passed our inspection, we will send you a completion letter within 7 working days. It's important to ensure your connection is inspected to prevent any risk of disconnection at a later date.

Technical Approval

We are pleased to advise that your Section 106 application to connect **Foul Water** to the public **Foul** sewer, as shown on your Drawing Number **DL/1334/07/01**, revision **P2**, dated **05/12/25**, is approved by Southern Water. Our approval means we are satisfied with your connection method. Inspection of the wastewater connection is required to complete your Section 106 application. Please note approval is valid for 2 years from date of issue.

Connections to existing/new Southern Water assets (i.e., manholes) and the arrangement of Southern Water assets (i.e., pipe junctions within manholes) should always be in accordance with the new Design and Construction Guidance manual ("the Code") and Southern Water's guidance documentation. [water.org.uk/sewerage-sector-guidance-approved-documents/](https://www.water.org.uk/sewerage-sector-guidance-approved-documents/)

This Section 106 approval does not confirm that public sewer network capacity is available at your location for the proposed development. The availability of capacity may be assessed through the Pre-Planning Enquiry process.

Please note that your connection should not proceed if:

- There are unapproved changes to your submitted plan or to the intended connection point. Any unapproved changes may lead to us disconnecting your connection under Section 109 of the Water Industry Act 1991.
- The relevant Planning Authority has set out conditions relating to the site's drainage and those conditions have not yet been discharged.
- You have not consulted our Health and Safety Advisory that can be viewed at the following link southernwater.co.uk/developing-building/health-and-safety
- You have not obtained the necessary Building Regulations Approvals or, if relevant, obtained a Highway Authority Road Opening License.

- Landowner consent has not been obtained where your connection is to be made through another Party's land.

Please contact the Developer Services Team via the Get Connected customer dashboard / on 0330 303 0119 should you require any further advice.

Yours sincerely,



Dale Hughes
Technical Coordinator - Wastewater
Developer Services
07460 644246



Essential Sewer Connection Information

1. Site Inspection Checklist
2. What happens if the sewer connection is not inspected?
3. Adoption of a sewer
4. Infrastructure charges
5. Enforcement Policy

1. Site Inspection Checklist

We have prepared a site inspection checklist so that inspection of your sewer connection can be passed first time southernwater.co.uk/media/3028/ds-site-inspection-checklist.pdf

2. What happens if the sewer connection is not inspected and a completion letter is not issued?

Incidences where construction of the sewer connection has been completed but a site inspection has not been requested then the sewer connection application is not completed. You will need to request for a site inspection to finalise the application. If the sewer connection has not been built as per the designs submitted then we will ask you to rectify.

3. Adoption of a sewer

When a new development is planned, the developer can construct the sewers using approved materials and to a standard, which makes them suitable for adoption by Southern Water when construction is complete.

An adoption agreement can be entered into under Section 104 of the Water Industry Act 1991, prior to the sewers being built. This is the most desirable arrangement and if all new developments were covered by such adoption agreements, there would be few, if any, new private sewers on housing estates. However, there are many kilometres of existing private sewers that were built without an adoption agreement in place.

Section 102 of the Water Industry Act 1991 provides for the adoption of such sewers to be considered. It is important to draw a distinction between sewers, drains, and lateral drains:

- Sewers are pipes carrying sewage from more than one property
- Drains are pipes carrying sewage from only one property to the curtilage of the building or premises
- Lateral drains are those pipes which extend from the curtilage of a single building to the point of connection with an existing public or private sewer



To start the process of having the private sewer adopted, please visit our website and fill in the S102 Adoption Form.

4. Infrastructure charges

New developments increase the load on our networks and may require investment in upstream network reinforcement. This investment is funded through the Infrastructure Charge where the cost of network reinforcement is levied per property at the time of final connection.

* In addition to the sewer connection application charge, a charge for sewerage infrastructure is levied on each dwelling connecting onto the sewerage system. Non domestic properties will be individually assessed according to the number of appliances/fittings producing wastewater. Infrastructure charges are applicable even if the connection is made via a private sewer providing that the private sewer ultimately discharges into the public system.

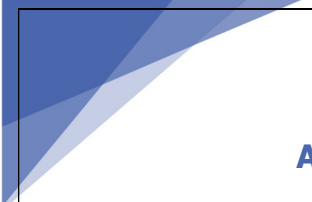
There are three scenarios:

1. Water and wastewater connections are made within Southern Waters supply area. Infrastructure charges will be included in you water connection quote.
2. Water connections are made within another water company's supply zone and Wastewater is within the Southern Water supply area. Infrastructure charges will be invoiced following connection of the meters as advised by each water company.
3. You already have a water connection and require a wastewater connection in the Southern Water supply area. Infrastructure charges will be invoiced directly following completion of the wastewater connection.

For information and our current Connection Charges please refer to section 2 of the Southern Water Charging Arrangements [Connection charging arrangements \(southernwater.co.uk\)](https://www.southernwater.co.uk/connection-charging-arrangements)

5. Enforcement Policy

It is an offence to not comply with the requirements of a S106 Water Industry Act 1991, which are detailed in the body of the letter. This can result in prosecution and a fine and/or removal of the illegal connection.



APPENDIX C – SURFACE WATER DRAINAGE CALCULATIONS

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Detailed	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	1.000	Drain Down Time (mins)	10080	Check Discharge Volume	x
Winter CV	1.000	Additional Storage (m³/ha)	0.0		

Storm Durations

15	60	180	360	600	960	2160	4320	7200	10080
30	120	240	480	720	1440	2880	5760	8640	

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
1	0	0	0
2	0	0	0
30	0	0	0
30	35	0	0
100	0	0	0
100	45	0	0



Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	100	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	1.000
CV	1.000	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	150.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Diameter (mm)	Easting (m)	Northing (m)	Depth (m)	Invert Level (m)
SW18			88.700	1200	538463.448	127876.678	1.550	87.150
SW2		5.00	88.700	1200	538471.665	127881.605	1.550	87.150
SW1	0.039	5.00	89.500	600	538460.422	127900.357	1.200	88.300
SW3	0.092	5.00	88.750	1200	538468.254	127887.294	1.650	87.100
SW4	0.016	5.00	89.800	1200	538431.073	127880.064	2.460	87.340
SW5	0.086	5.00	89.090	1200	538437.529	127868.873	2.290	86.800
SW6			89.240	1200	538424.255	127854.511	2.580	86.660
SW7	0.057	5.00	90.370	1200	538406.880	127864.586	1.300	89.070
SW8			89.600	1200	538412.055	127854.088	2.940	86.660
SW9	0.019	5.00	89.640	1200	538389.951	127837.600	2.980	86.660
SW10		5.00	90.950	600	538368.532	127858.700	1.450	89.500
SW100	0.007	5.00	92.250	600	538390.268	127893.528	1.450	90.800
SW101	0.031	5.00	92.050	600	538367.927	127881.091	1.550	90.500
SW34			91.470	500	538368.524	127870.985	1.470	90.000
SW35			91.470	500	538381.705	127848.137	2.470	89.000
SW11	0.041	5.00	90.070	600	538377.491	127843.269	1.750	88.320
SW12	0.067	5.00	89.500	1200	538385.193	127833.607	3.120	86.380
SW13	0.016	5.00	87.900	1200	538390.609	127810.698	1.640	86.260
SW14	0.024	5.00	86.850	1200	538410.714	127801.320	1.440	85.410
SW43		5.00	85.900	1200	538446.483	127801.438	1.600	84.300
SW15	0.044	5.00	86.250	1200	538434.770	127804.174	2.180	84.070
SW16			86.000	1200	538433.763	127797.765	2.799	83.201
SW17		5.00	85.400	1500	538449.419	127794.102	2.200	83.200
HW			84.310	1	538451.846	127781.267	1.190	83.120



Links

Name	US Node	DS Node	Length (m)	ks (mm) / n	US IL (m)	DS IL (m)	Fall (m)	Slope (1:X)	Dia (mm)	T of C (mins)	Rain (mm/hr)
1.000	SW2	SW3	6.633	0.600	87.150	87.100	0.050	132.7	300	5.08	150.0
2.000	SW1	SW3	15.231	0.600	88.300	87.100	1.200	12.7	225	5.07	150.0
1.001	SW3	SW5	35.824	0.600	87.100	86.880	0.220	162.8	300	5.57	150.0
3.000	SW4	SW5	12.920	0.600	87.340	87.250	0.090	143.6	225	5.20	150.0
1.002	SW5	SW6	19.557	0.600	86.800	86.700	0.100	195.6	300	5.86	150.0
8.000	SW7	SW8	11.704	0.600	89.070	88.100	0.970	12.1	225	5.05	150.0
1.004	SW9	SW12	6.212	0.600	86.660	86.610	0.050	124.2	150	5.12	150.0
4.000	SW10	SW11	17.843	0.600	89.500	88.400	1.100	16.2	150	5.12	150.0
4.001	SW11	SW12	12.356	0.600	88.320	88.000	0.320	38.6	225	5.82	150.0
1.005	SW12	SW13	23.541	0.600	86.380	86.260	0.120	196.2	375	6.13	150.0
1.006	SW13	SW14	22.185	0.600	86.260	85.410	0.850	26.1	375	6.23	150.0
1.007	SW14	SW15	24.225	0.600	85.410	84.600	0.810	29.9	375	6.35	150.0
6.000	SW43	SW15	12.029	0.600	84.300	84.220	0.080	150.4	225	5.19	150.0
1.008	SW15	SW16	6.488	0.600	84.070	84.030	0.040	162.2	375	6.43	150.0
1.010	SW17	HW	13.062	0.600	83.200	83.120	0.080	163.3	150	5.28	150.0
10.000	SW100	SW101	25.569	0.600	90.800	90.500	0.300	85.2	150	5.39	150.0
10.001	SW101	SW34	10.124	0.600	90.500	90.000	0.500	20.2	150	5.47	150.0
10.002	SW34	SW35	26.377	0.600	90.000	89.000	1.000	26.4	150	5.69	150.0
10.003	SW35	SW11	6.439	0.600	89.000	88.400	0.600	10.7	150	5.72	150.0

Name	Vel (m/s)	Cap (l/s)	Flow (l/s)	US Depth (m)	DS Depth (m)	Σ Area (ha)	Σ Add Inflow (l/s)
1.000	1.363	96.4	0.0	1.250	1.350	0.000	0.0
2.000	3.692	146.8	21.2	0.975	1.425	0.039	0.0
1.001	1.229	86.9	71.1	1.350	1.910	0.131	0.0
3.000	1.089	43.3	8.5	2.235	1.615	0.016	0.0
1.002	1.120	79.2	126.4	1.990	2.240	0.233	0.0
8.000	3.787	150.6	31.0	1.075	1.275	0.057	0.0
1.004	0.900	15.9	10.1	2.830	2.740	0.019	0.0
4.000	2.513	44.4	0.0	1.300	1.520	0.000	0.0
4.001	2.111	83.9	42.6	1.525	1.275	0.079	0.0
1.005	1.290	142.5	88.9	2.745	1.265	0.164	0.0
1.006	3.558	393.0	97.6	1.265	1.065	0.180	0.0
1.007	3.323	367.0	110.8	1.065	1.275	0.204	0.0
6.000	1.064	42.3	0.0	1.375	1.805	0.000	0.0
1.008	1.420	156.8	134.9	1.805	1.595	0.249	0.0
1.010	0.784	13.8	0.0	2.050	1.040	0.000	0.0
10.000	1.089	19.2	3.8	1.300	1.400	0.007	0.0
10.001	2.248	39.7	20.6	1.400	1.320	0.038	0.0
10.002	1.968	34.8	20.6	1.320	2.320	0.038	0.0
10.003	3.093	54.7	20.6	2.320	1.520	0.038	0.0



Pipeline Schedule

Link	Length (m)	Slope (1:X)	Dia (mm)	Link Type	US CL (m)	US IL (m)	US Depth (m)	DS CL (m)	DS IL (m)	DS Depth (m)
1.000	6.633	132.7	300	Circular	88.700	87.150	1.250	88.750	87.100	1.350
2.000	15.231	12.7	225	Circular	89.500	88.300	0.975	88.750	87.100	1.425
1.001	35.824	162.8	300	Circular	88.750	87.100	1.350	89.090	86.880	1.910
3.000	12.920	143.6	225	Circular	89.800	87.340	2.235	89.090	87.250	1.615
1.002	19.557	195.6	300	Circular	89.090	86.800	1.990	89.240	86.700	2.240
8.000	11.704	12.1	225	Circular	90.370	89.070	1.075	89.600	88.100	1.275
1.004	6.212	124.2	150	Circular	89.640	86.660	2.830	89.500	86.610	2.740
4.000	17.843	16.2	150	Circular	90.950	89.500	1.300	90.070	88.400	1.520
4.001	12.356	38.6	225	Circular	90.070	88.320	1.525	89.500	88.000	1.275
1.005	23.541	196.2	375	Circular	89.500	86.380	2.745	87.900	86.260	1.265
1.006	22.185	26.1	375	Circular	87.900	86.260	1.265	86.850	85.410	1.065
1.007	24.225	29.9	375	Circular	86.850	85.410	1.065	86.250	84.600	1.275
6.000	12.029	150.4	225	Circular	85.900	84.300	1.375	86.250	84.220	1.805
1.008	6.488	162.2	375	Circular	86.250	84.070	1.805	86.000	84.030	1.595
1.010	13.062	163.3	150	Circular	85.400	83.200	2.050	84.310	83.120	1.040
10.000	25.569	85.2	150	Circular	92.250	90.800	1.300	92.050	90.500	1.400
10.001	10.124	20.2	150	Circular	92.050	90.500	1.400	91.470	90.000	1.320
10.002	26.377	26.4	150	Circular	91.470	90.000	1.320	91.470	89.000	2.320
10.003	6.439	10.7	150	Circular	91.470	89.000	2.320	90.070	88.400	1.520

Link	US Node	Dia (mm)	Node Type	MH Type	DS Node	Dia (mm)	Node Type	MH Type
1.000	SW2	1200	Manhole	Adoptable	SW3	1200	Manhole	Adoptable
2.000	SW1	600	Manhole	Adoptable	SW3	1200	Manhole	Adoptable
1.001	SW3	1200	Manhole	Adoptable	SW5	1200	Manhole	Adoptable
3.000	SW4	1200	Manhole	Adoptable	SW5	1200	Manhole	Adoptable
1.002	SW5	1200	Manhole	Adoptable	SW6	1200	Manhole	Adoptable
8.000	SW7	1200	Manhole	Adoptable	SW8	1200	Manhole	Adoptable
1.004	SW9	1200	Manhole	Adoptable	SW12	1200	Manhole	Adoptable
4.000	SW10	600	Manhole	Adoptable	SW11	600	Manhole	Adoptable
4.001	SW11	600	Manhole	Adoptable	SW12	1200	Manhole	Adoptable
1.005	SW12	1200	Manhole	Adoptable	SW13	1200	Manhole	Adoptable
1.006	SW13	1200	Manhole	Adoptable	SW14	1200	Manhole	Adoptable
1.007	SW14	1200	Manhole	Adoptable	SW15	1200	Manhole	Adoptable
6.000	SW43	1200	Manhole	Adoptable	SW15	1200	Manhole	Adoptable
1.008	SW15	1200	Manhole	Adoptable	SW16	1200	Manhole	Adoptable
1.010	SW17	1500	Manhole	Adoptable	HW	1	Manhole	Adoptable
10.000	SW100	600	Manhole	Adoptable	SW101	600	Manhole	Adoptable
10.001	SW101	600	Manhole	Adoptable	SW34	500	Manhole	Adoptable
10.002	SW34	500	Manhole	Adoptable	SW35	500	Manhole	Adoptable
10.003	SW35	500	Manhole	Adoptable	SW11	600	Manhole	Adoptable



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)	
SW18	538463.448	127876.678	88.700	1.550	1200					
SW2	538471.665	127881.605	88.700	1.550	1200		0	1.000	87.150	300
SW1	538460.422	127900.357	89.500	1.200	600		0	2.000	88.300	225
SW3	538468.254	127887.294	88.750	1.650	1200		1 2 0	2.000 1.000 1.001	87.100 87.100 87.100	225 300 300
SW4	538431.073	127880.064	89.800	2.460	1200		0	3.000	87.340	225
SW5	538437.529	127868.873	89.090	2.290	1200		1 2 0	3.000 1.001 1.002	87.250 86.880 86.800	225 300 300
SW6	538424.255	127854.511	89.240	2.580	1200		1	1.002	86.700	300
SW7	538406.880	127864.586	90.370	1.300	1200		0	8.000	89.070	225
SW8	538412.055	127854.088	89.600	2.940	1200		1	8.000	88.100	225
SW9	538389.951	127837.600	89.640	2.980	1200		0	1.004	86.660	150
SW10	538368.532	127858.700	90.950	1.450	600		0	4.000	89.500	150
SW100	538390.268	127893.528	92.250	1.450	600		0	10.000	90.800	150



Manhole Schedule

Node	Easting (m)	Northing (m)	CL (m)	Depth (m)	Dia (mm)	Connections	Link	IL (m)	Dia (mm)
SW101	538367.927	127881.091	92.050	1.550	600	 1 0	10.000	90.500	150
SW34	538368.524	127870.985	91.470	1.470	500	 1 0	10.001	90.500	150
SW35	538381.705	127848.137	91.470	2.470	500	 1 0	10.002	90.000	150
SW11	538377.491	127843.269	90.070	1.750	600	 1 0	10.003	89.000	150
SW12	538385.193	127833.607	89.500	3.120	1200	 1 2 0	4.000	88.400	150
SW13	538390.609	127810.698	87.900	1.640	1200	 1 0	4.001	88.320	225
SW14	538410.714	127801.320	86.850	1.440	1200	 1 2 0	1.004	86.610	150
SW43	538446.483	127801.438	85.900	1.600	1200	 1 0	1.005	86.380	375
SW15	538434.770	127804.174	86.250	2.180	1200	 1 0	1.006	86.260	375
SW16	538433.763	127797.765	86.000	2.799	1200	 1 0	1.007	85.410	375
SW17	538449.419	127794.102	85.400	2.200	1500	 1 0	6.000	84.300	225
HW	538451.846	127781.267	84.310	1.190	1	 1 0	1.007	84.220	225
						 1 0	1.008	84.600	375
						 1 0	1.008	84.070	375
						 1 0	1.010	83.200	150
						 1 0	1.010	83.120	150



Node SW17 Online Hydro -Brake® Control

Flap Valve	x
Replaces Downstream Link	✓
Invert Level (m)	83.200
Design Depth (m)	2.100
Design Flow (l/s)	3.0
Objective	(HE) Minimise upstream storage
Sump Available	✓
Product Number	CTL-SHE-0070-3000-2100-3000
Min Outlet Diameter (m)	0.100
Min Node Diameter (mm)	1200

Node SW9 Online Hydro -Brake® Control

Flap Valve	x
Replaces Downstream Link	x
Invert Level (m)	86.660
Design Depth (m)	2.040
Design Flow (l/s)	3.0
Objective	(HE) Minimise upstream storage
Sump Available	✓
Product Number	CTL-SHE-0070-3000-2040-3000
Min Outlet Diameter (m)	0.100
Min Node Diameter (mm)	1200

Node SW101 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.400	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.1		
Invert Level (m)	90.500	Diameter (m)	0.021		

Node SW100 Online Orifice Control

Flap Valve	x	Design Depth (m)	1.450	Discharge Coefficient	0.600
Replaces Downstream Link	x	Design Flow (l/s)	1.1		
Invert Level (m)	90.800	Diameter (m)	0.020		

Node SW2 Tank Storage Structure

Invert Level (m)	87.150	Analyse flow through structure	x
Time to half empty (mins)	645		

Inlets SW18

Depth (m)	Area (m²)	Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	95.0	0.750	95.0	0.751	0.0



Node SW9 Tank Storage Structure

Invert Level (m)	86.660	Analyse flow through structure	x
Time to half empty (mins)	1095		

Inlets

SW6 | SW8

Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)	Depth (m)	Area (m ²)
0.000	120.0	0.750	120.0	1.500	120.0	1.501	0.0

Node SW17 Flow through Pond Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Main Channel Length (m)	14.000
Side Inf Coefficient (m/hr)	0.00000	Invert Level (m)	83.200	Main Channel Slope (1:X)	10000.0
Safety Factor	2.0	Time to half empty (mins)	3240	Main Channel n	0.030

Inlets

SW16

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	200.0	200.0	0.750	200.0	237.6	1.500	200.0	275.2	1.501	0.0	275.2

Node SW100 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	90.800
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	192

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	20.0	20.0	0.210	20.0	23.3	0.420	20.0	26.7	0.421	0.0	26.7

Node SW101 Depth/Area Storage Structure

Base Inf Coefficient (m/hr)	0.00000	Safety Factor	2.0	Invert Level (m)	90.500
Side Inf Coefficient (m/hr)	0.00000	Porosity	0.95	Time to half empty (mins)	536

Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)	Depth (m)	Area (m ²)	Inf Area (m ²)
0.000	45.0	20.0	0.210	45.0	23.3	0.420	45.0	26.7	0.421	0.0	26.7



Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute summer	SW18	32	87.153	0.003	0.3	0.0000	0.0000	OK
30 minute summer	SW2	22	87.153	0.003	0.8	0.2524	0.0000	OK
15 minute summer	SW1	10	88.327	0.027	4.6	0.0077	0.0000	OK
15 minute summer	SW3	10	87.184	0.084	15.5	0.0948	0.0000	OK
15 minute summer	SW4	10	87.372	0.032	1.9	0.0365	0.0000	OK
480 minute summer	SW5	320	86.990	0.190	7.1	0.2147	0.0000	OK
480 minute summer	SW6	320	86.990	0.330	6.9	0.0000	0.0000	OK
15 minute summer	SW7	10	89.103	0.033	6.8	0.0377	0.0000	OK
480 minute summer	SW8	320	86.987	0.327	2.3	0.0000	0.0000	OK
480 minute summer	SW9	320	86.984	0.324	5.0	39.4353	0.0000	SURCHARGED
15 minute summer	SW10	1	89.500	0.000	0.0	0.0000	0.0000	OK
180 minute summer	SW100	116	90.833	0.033	0.4	0.6397	0.0000	OK
720 minute summer	SW101	480	90.604	0.104	0.8	4.4551	0.0000	OK
720 minute summer	SW34	480	90.010	0.010	0.3	0.0020	0.0000	OK
720 minute summer	SW35	480	89.008	0.008	0.3	0.0016	0.0000	OK
15 minute summer	SW11	10	88.357	0.037	4.8	0.0106	0.0000	OK
15 minute summer	SW12	10	86.460	0.080	13.0	0.0902	0.0000	OK
15 minute summer	SW13	11	86.309	0.049	14.7	0.0558	0.0000	OK
15 minute summer	SW14	11	85.467	0.057	17.6	0.0644	0.0000	OK
15 minute summer	SW43	1	84.300	0.000	0.0	0.0000	0.0000	OK
15 minute summer	SW15	11	84.176	0.105	22.7	0.1193	0.0000	OK
1440 minute summer	SW16	1170	83.514	0.313	4.9	0.3539	0.0000	OK
1440 minute summer	SW17	1170	83.514	0.314	3.4	0.5547	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	SW2	1.000	SW3	-0.8	-0.137	-0.008	0.0505	
15 minute summer	SW1	2.000	SW3	4.6	0.622	0.031	0.1233	
15 minute summer	SW3	1.001	SW5	14.4	0.911	0.166	0.5654	
15 minute summer	SW4	3.000	SW5	1.8	0.540	0.043	0.0443	
480 minute summer	SW5	1.002	SW6	6.9	0.421	0.087	1.1412	
15 minute summer	SW7	8.000	SW8	6.8	1.887	0.045	0.0419	
480 minute summer	SW9	1.004	SW12	2.2	0.613	0.136	0.0219	
15 minute summer	SW10	4.000	SW11	0.0	0.000	0.000	0.0000	
180 minute summer	SW100	10.000	SW101	0.1	0.039	0.007	0.1458	
720 minute summer	SW101	10.001	SW34	0.3	0.599	0.007	0.0048	
720 minute summer	SW34	10.002	SW35	0.3	0.657	0.008	0.0113	
720 minute summer	SW35	10.003	SW11	0.3	0.802	0.005	0.0023	
15 minute summer	SW11	4.001	SW12	4.8	1.128	0.057	0.0522	
15 minute summer	SW12	1.005	SW13	12.9	1.027	0.091	0.3011	
15 minute summer	SW13	1.006	SW14	14.8	1.556	0.038	0.2108	
15 minute summer	SW14	1.007	SW15	17.6	1.713	0.048	0.2496	
15 minute summer	SW43	6.000	SW15	0.0	0.000	0.000	0.0000	
15 minute summer	SW15	1.008	SW16	22.7	0.961	0.145	0.1535	
1440 minute summer	SW16	Flow through Pond	SW17	3.4	0.003	0.001	59.5604	
1440 minute summer	SW17	Hydro-Brake®	HW	2.1				173.2



Results for 1 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	HW	1	83.120	0.000	1.1	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)



Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
30 minute winter	SW18	29	87.156	0.006	0.6	0.0000	0.0000	OK
30 minute summer	SW2	23	87.157	0.007	1.8	0.6256	0.0000	OK
15 minute summer	SW1	10	88.334	0.034	7.2	0.0096	0.0000	OK
15 minute summer	SW3	10	87.205	0.105	24.1	0.1192	0.0000	OK
15 minute summer	SW4	10	87.380	0.040	2.9	0.0451	0.0000	OK
360 minute summer	SW5	264	87.105	0.305	11.4	0.3452	0.0000	SURCHARGED
360 minute summer	SW6	264	87.105	0.445	10.6	0.0000	0.0000	OK
15 minute summer	SW7	10	89.112	0.042	10.5	0.0470	0.0000	OK
360 minute summer	SW8	272	87.102	0.442	4.0	0.0000	0.0000	OK
360 minute summer	SW9	272	87.100	0.440	7.3	53.3304	0.0000	SURCHARGED
15 minute summer	SW10	1	89.500	0.000	0.0	0.0000	0.0000	OK
180 minute summer	SW100	116	90.846	0.046	0.5	0.8824	0.0000	OK
480 minute summer	SW101	336	90.641	0.141	1.3	6.0539	0.0000	OK
480 minute summer	SW34	336	90.011	0.011	0.3	0.0021	0.0000	OK
480 minute summer	SW35	336	89.009	0.009	0.3	0.0017	0.0000	OK
15 minute summer	SW11	10	88.367	0.047	7.4	0.0132	0.0000	OK
15 minute summer	SW12	10	86.480	0.100	20.4	0.1128	0.0000	OK
15 minute summer	SW13	11	86.321	0.061	23.1	0.0694	0.0000	OK
15 minute summer	SW14	11	85.481	0.071	27.5	0.0807	0.0000	OK
15 minute summer	SW43	1	84.300	0.000	0.0	0.0000	0.0000	OK
15 minute summer	SW15	11	84.205	0.135	35.4	0.1522	0.0000	OK
1440 minute winter	SW16	1320	83.629	0.428	4.7	0.4839	0.0000	OK
1440 minute winter	SW17	1320	83.629	0.429	3.4	0.7578	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
30 minute summer	SW2	1.000	SW3	-1.8	-0.225	-0.018	0.0684	
15 minute summer	SW1	2.000	SW3	7.2	0.692	0.049	0.1673	
15 minute summer	SW3	1.001	SW5	21.8	1.021	0.251	0.7704	
15 minute summer	SW4	3.000	SW5	2.8	0.608	0.065	0.0598	
360 minute summer	SW5	1.002	SW6	10.6	0.455	0.134	1.3772	
15 minute summer	SW7	8.000	SW8	10.4	2.133	0.069	0.0573	
360 minute summer	SW9	1.004	SW12	2.2	0.613	0.136	0.0220	
15 minute summer	SW10	4.000	SW11	0.0	0.000	0.000	0.0000	
180 minute summer	SW100	10.000	SW101	0.2	0.048	0.008	0.2086	
480 minute summer	SW101	10.001	SW34	0.3	0.628	0.008	0.0054	
480 minute summer	SW34	10.002	SW35	0.3	0.696	0.010	0.0128	
480 minute summer	SW35	10.003	SW11	0.3	0.843	0.006	0.0025	
15 minute summer	SW11	4.001	SW12	7.4	1.275	0.088	0.0713	
15 minute summer	SW12	1.005	SW13	20.3	1.172	0.143	0.4139	
15 minute summer	SW13	1.006	SW14	23.2	1.769	0.059	0.2915	
15 minute summer	SW14	1.007	SW15	27.6	1.944	0.075	0.3441	
15 minute summer	SW43	6.000	SW15	0.0	0.000	0.000	0.0000	
15 minute summer	SW15	1.008	SW16	35.5	1.081	0.226	0.2132	
1440 minute winter	SW16	Flow through Pond	SW17	3.4	0.002	0.001	81.4053	
1440 minute winter	SW17	Hydro-Brake®	HW	2.1				215.8



Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	HW	1	83.120	0.000	1.7	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
480 minute winter	SW18	472	87.483	0.333	4.4	0.0000	0.0000	OK
480 minute winter	SW2	464	87.483	0.333	8.9	31.5686	0.0000	SURCHARGED
15 minute summer	SW1	10	88.354	0.054	18.7	0.0153	0.0000	OK
480 minute winter	SW3	464	87.483	0.383	9.2	0.4335	0.0000	SURCHARGED
480 minute winter	SW4	464	87.483	0.143	0.8	0.1621	0.0000	OK
480 minute winter	SW5	464	87.483	0.683	11.1	0.7728	0.0000	SURCHARGED
480 minute winter	SW6	464	87.483	0.823	10.5	0.0000	0.0000	OK
15 minute summer	SW7	10	89.139	0.069	27.4	0.0781	0.0000	OK
480 minute winter	SW8	464	87.480	0.820	4.1	0.0000	0.0000	OK
480 minute winter	SW9	464	87.477	0.817	7.3	98.9123	0.0000	SURCHARGED
15 minute summer	SW10	1	89.500	0.000	0.0	0.0000	0.0000	OK
120 minute winter	SW100	92	90.905	0.105	1.0	2.0324	0.0000	OK
360 minute winter	SW101	336	90.807	0.307	2.2	13.2160	0.0000	SURCHARGED
360 minute winter	SW34	336	90.013	0.013	0.5	0.0026	0.0000	OK
360 minute winter	SW35	336	89.010	0.010	0.5	0.0020	0.0000	OK
15 minute summer	SW11	10	88.399	0.079	19.6	0.0223	0.0000	OK
15 minute summer	SW12	10	86.544	0.164	53.3	0.1857	0.0000	OK
15 minute summer	SW13	10	86.361	0.101	60.6	0.1140	0.0000	OK
15 minute summer	SW14	10	85.528	0.118	71.9	0.1337	0.0000	OK
15 minute summer	SW43	11	84.308	0.008	0.2	0.0091	0.0000	OK
15 minute summer	SW15	10	84.305	0.235	92.5	0.2660	0.0000	OK
2880 minute winter	SW16	2820	84.227	1.026	5.0	1.1605	0.0000	OK
2880 minute winter	SW17	2820	84.227	1.027	3.6	1.8149	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
480 minute winter	SW2	1.000	SW3	-8.9	-0.444	-0.093	0.4671	
15 minute summer	SW1	2.000	SW3	18.6	0.953	0.127	0.3015	
480 minute winter	SW3	1.001	SW5	6.2	0.642	0.071	2.5227	
480 minute winter	SW4	3.000	SW5	0.8	0.422	0.018	0.4293	
480 minute winter	SW5	1.002	SW6	10.5	0.486	0.133	1.3772	
15 minute summer	SW7	8.000	SW8	27.3	2.767	0.181	0.1154	
480 minute winter	SW9	1.004	SW12	2.2	0.613	0.136	0.0220	
15 minute summer	SW10	4.000	SW11	0.0	0.000	0.000	0.0000	
120 minute winter	SW100	10.000	SW101	0.3	0.042	0.013	0.2336	
360 minute winter	SW101	10.001	SW34	0.5	0.716	0.013	0.0071	
360 minute winter	SW34	10.002	SW35	0.5	0.782	0.014	0.0169	
360 minute winter	SW35	10.003	SW11	0.5	0.955	0.009	0.0034	
15 minute summer	SW11	4.001	SW12	19.5	1.653	0.232	0.1455	
15 minute summer	SW12	1.005	SW13	52.9	1.522	0.371	0.8257	
15 minute summer	SW13	1.006	SW14	60.2	2.254	0.153	0.5936	
15 minute summer	SW14	1.007	SW15	71.4	2.517	0.194	0.6889	
15 minute summer	SW43	6.000	SW15	-0.2	-0.033	-0.004	0.0848	
15 minute summer	SW15	1.008	SW16	92.1	1.380	0.587	0.4329	
2880 minute winter	SW16	Flow through Pond	SW17	3.6	0.002	0.001	195.0882	
2880 minute winter	SW17	Hydro-Brake®	HW	2.2				488.7



Results for 30 year Critical Storm Duration. Lowest mass balance: 99.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	HW	1	83.120	0.000	2.1	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)



Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	SW18	585	87.749	0.599	4.7	0.0000	0.0000	OK
600 minute winter	SW2	585	87.750	0.600	9.6	56.8736	0.0000	SURCHARGED
15 minute summer	SW1	10	88.363	0.063	25.2	0.0178	0.0000	OK
600 minute winter	SW3	585	87.750	0.650	9.9	0.7354	0.0000	SURCHARGED
600 minute winter	SW4	585	87.750	0.410	0.9	0.4640	0.0000	SURCHARGED
600 minute winter	SW5	585	87.750	0.950	10.5	1.0747	0.0000	SURCHARGED
600 minute winter	SW6	585	87.750	1.090	9.9	0.0000	0.0000	OK
15 minute summer	SW7	10	89.152	0.082	36.9	0.0924	0.0000	OK
600 minute winter	SW8	585	87.747	1.087	3.7	0.0000	0.0000	OK
600 minute winter	SW9	585	87.743	1.083	6.9	131.0422	0.0000	SURCHARGED
15 minute summer	SW10	1	89.500	0.000	0.0	0.0000	0.0000	OK
120 minute winter	SW100	106	90.949	0.149	1.4	2.8686	0.0000	OK
360 minute winter	SW101	328	90.910	0.410	2.9	17.6227	0.0000	SURCHARGED
360 minute winter	SW34	336	90.014	0.014	0.6	0.0028	0.0000	OK
360 minute winter	SW35	336	89.011	0.011	0.6	0.0022	0.0000	OK
15 minute summer	SW11	10	88.413	0.093	26.3	0.0264	0.0000	OK
15 minute summer	SW12	10	86.573	0.193	71.3	0.2179	0.0000	OK
15 minute summer	SW13	10	86.378	0.118	81.1	0.1336	0.0000	OK
15 minute summer	SW14	10	85.549	0.139	96.4	0.1577	0.0000	OK
7200 minute winter	SW43	5400	84.582	0.282	0.0	0.3188	0.0000	SURCHARGED
7200 minute winter	SW15	5400	84.582	0.512	4.3	0.5789	0.0000	SURCHARGED
7200 minute winter	SW16	5400	84.582	1.381	4.3	1.5617	0.0000	OK
7200 minute winter	SW17	5400	84.582	1.382	3.1	2.4417	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
600 minute winter	SW2	1.000	SW3	-9.6	-0.411	-0.099	0.4671	
15 minute summer	SW1	2.000	SW3	25.1	0.932	0.171	0.3717	
600 minute winter	SW3	1.001	SW5	5.9	0.583	0.068	2.5227	
600 minute winter	SW4	3.000	SW5	0.9	0.436	0.021	0.5138	
600 minute winter	SW5	1.002	SW6	9.9	0.511	0.125	1.3772	
15 minute summer	SW7	8.000	SW8	36.7	2.983	0.244	0.1442	
600 minute winter	SW9	1.004	SW12	2.2	0.617	0.139	0.0223	
15 minute summer	SW10	4.000	SW11	0.0	0.000	0.000	0.0067	
120 minute winter	SW100	10.000	SW101	0.3	0.041	0.015	0.3338	
360 minute winter	SW101	10.001	SW34	0.6	0.750	0.015	0.0079	
360 minute winter	SW34	10.002	SW35	0.6	0.821	0.017	0.0188	
360 minute winter	SW35	10.003	SW11	0.6	0.998	0.011	0.0037	
15 minute summer	SW11	4.001	SW12	26.1	1.779	0.311	0.1816	
15 minute summer	SW12	1.005	SW13	70.8	1.643	0.497	1.0206	
15 minute summer	SW13	1.006	SW14	80.6	2.411	0.205	0.7429	
15 minute summer	SW14	1.007	SW15	95.8	2.711	0.261	0.8580	
7200 minute winter	SW43	6.000	SW15	0.0	-0.003	0.000	0.4784	
7200 minute winter	SW15	1.008	SW16	4.3	0.607	0.027	0.7156	
7200 minute winter	SW16	Flow through Pond	SW17	3.1	0.002	0.001	262.4994	
7200 minute winter	SW17	Hydro-Brake®	HW	2.5				876.8



Results for 30 year +35% CC Critical Storm Duration. Lowest mass balance: 99.90%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	HW	1	83.120	0.000	2.1	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
600 minute winter	SW18	585	87.662	0.512	4.1	0.0000	0.0000	OK
600 minute winter	SW2	570	87.662	0.512	8.2	48.5281	0.0000	SURCHARGED
15 minute summer	SW1	10	88.361	0.061	23.6	0.0172	0.0000	OK
600 minute winter	SW3	570	87.662	0.562	8.7	0.6358	0.0000	SURCHARGED
600 minute winter	SW4	570	87.662	0.322	0.8	0.3643	0.0000	SURCHARGED
600 minute winter	SW5	570	87.662	0.862	9.7	0.9751	0.0000	SURCHARGED
600 minute winter	SW6	570	87.662	1.002	9.1	0.0000	0.0000	OK
15 minute summer	SW7	10	89.149	0.079	34.5	0.0889	0.0000	OK
600 minute winter	SW8	570	87.659	0.999	3.8	0.0000	0.0000	OK
600 minute winter	SW9	570	87.655	0.995	6.8	120.4310	0.0000	SURCHARGED
15 minute summer	SW10	1	89.500	0.000	0.0	0.0000	0.0000	OK
180 minute summer	SW100	128	90.936	0.136	1.4	2.6173	0.0000	OK
600 minute winter	SW101	465	90.877	0.377	1.9	16.2121	0.0000	SURCHARGED
600 minute winter	SW34	465	90.014	0.014	0.6	0.0027	0.0000	OK
600 minute winter	SW35	465	89.011	0.011	0.6	0.0021	0.0000	OK
15 minute summer	SW11	10	88.410	0.090	24.7	0.0254	0.0000	OK
15 minute summer	SW12	10	86.566	0.186	66.9	0.2102	0.0000	OK
15 minute summer	SW13	10	86.374	0.114	76.1	0.1290	0.0000	OK
15 minute summer	SW14	10	85.544	0.134	90.4	0.1519	0.0000	OK
5760 minute winter	SW43	4620	84.494	0.194	0.0	0.2197	0.0000	OK
5760 minute winter	SW15	4620	84.494	0.424	4.6	0.4798	0.0000	SURCHARGED
5760 minute winter	SW16	4620	84.495	1.293	4.6	1.4626	0.0000	OK
5760 minute winter	SW17	4620	84.494	1.294	3.3	2.2869	0.0000	SURCHARGED

Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
600 minute winter	SW2	1.000	SW3	-8.2	-0.429	-0.085	0.4671	
15 minute summer	SW1	2.000	SW3	23.5	0.978	0.160	0.3685	
600 minute winter	SW3	1.001	SW5	5.4	0.599	0.062	2.5227	
600 minute winter	SW4	3.000	SW5	0.8	0.422	0.018	0.5138	
600 minute winter	SW5	1.002	SW6	9.1	0.492	0.115	1.3772	
15 minute summer	SW7	8.000	SW8	34.4	2.934	0.228	0.1371	
600 minute winter	SW9	1.004	SW12	2.2	0.613	0.136	0.0220	
15 minute summer	SW10	4.000	SW11	0.0	0.000	0.000	0.0043	
180 minute summer	SW100	10.000	SW101	0.3	0.036	0.015	0.3179	
600 minute winter	SW101	10.001	SW34	0.6	0.742	0.014	0.0076	
600 minute winter	SW34	10.002	SW35	0.6	0.809	0.016	0.0182	
600 minute winter	SW35	10.003	SW11	0.6	0.985	0.010	0.0036	
15 minute summer	SW11	4.001	SW12	24.5	1.752	0.292	0.1731	
15 minute summer	SW12	1.005	SW13	66.4	1.615	0.466	0.9740	
15 minute summer	SW13	1.006	SW14	75.6	2.377	0.192	0.7068	
15 minute summer	SW14	1.007	SW15	89.7	2.667	0.245	0.8171	
5760 minute winter	SW43	6.000	SW15	0.0	-0.002	0.000	0.4585	
5760 minute winter	SW15	1.008	SW16	4.6	0.619	0.029	0.7156	
5760 minute winter	SW16	Flow through Pond	SW17	3.3	0.003	0.001	245.8552	
5760 minute winter	SW17	Hydro-Brake®	HW	2.4				770.8



Results for 100 year Critical Storm Duration. Lowest mass balance: 99.89%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	HW	1	83.120	0.000	2.1	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)



Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 92.76%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	SW18	690	88.695	1.545	4.1	0.0000	0.0000	OK
720 minute winter	SW2	690	88.695	1.545	8.1	74.7775	0.0000	FLOOD RISK
720 minute winter	SW1	690	88.695	0.395	2.6	0.1118	0.0000	SURCHARGED
720 minute winter	SW3	690	88.695	1.595	8.8	1.8038	0.0000	FLOOD RISK
720 minute winter	SW4	690	88.695	1.355	1.1	1.5323	0.0000	SURCHARGED
720 minute winter	SW5	690	88.695	1.895	9.3	2.1430	0.0000	SURCHARGED
720 minute winter	SW6	690	88.695	2.035	8.9	0.0000	0.0000	OK
15 minute summer	SW7	10	89.168	0.098	50.1	0.1106	0.0000	OK
720 minute winter	SW8	690	88.690	2.030	3.9	0.0000	0.0000	OK
720 minute winter	SW9	690	88.686	2.026	6.3	184.4216	0.0000	SURCHARGED
15 minute summer	SW10	1	89.500	0.000	0.0	0.0000	0.0000	OK
240 minute winter	SW100	236	91.205	0.405	1.3	7.8118	0.0000	SURCHARGED
240 minute winter	SW101	172	91.853	1.353	5.2	18.3593	0.0000	FLOOD RISK
240 minute winter	SW34	172	90.019	0.019	1.1	0.0037	0.0000	OK
240 minute winter	SW35	172	89.015	0.015	1.1	0.0029	0.0000	OK
15 minute summer	SW11	10	88.432	0.112	35.7	0.0317	0.0000	OK
15 minute summer	SW12	10	86.609	0.229	96.0	0.2588	0.0000	OK
15 minute summer	SW13	10	86.400	0.140	109.4	0.1582	0.0000	OK
15 minute summer	SW14	10	85.576	0.166	130.1	0.1881	0.0000	OK
2880 minute winter	SW43	1980	84.791	0.491	0.1	0.5552	0.0000	SURCHARGED
2880 minute winter	SW15	1980	84.789	0.719	7.3	0.8127	0.0000	SURCHARGED
2880 minute winter	SW16	1980	84.796	1.594	12.4	1.8032	0.0000	OK
5760 minute summer	SW17	4380	84.786	1.586	5.7	2.8025	0.0000	SURCHARGED
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)
720 minute winter	SW2	1.000	SW3	-8.1	-0.446	-0.085	0.4671	
720 minute winter	SW1	2.000	SW3	2.6	0.441	0.018	0.6058	
720 minute winter	SW3	1.001	SW5	5.3	0.565	0.061	2.5227	
720 minute winter	SW4	3.000	SW5	1.0	0.421	0.023	0.5138	
720 minute winter	SW5	1.002	SW6	8.9	0.528	0.112	1.3772	
15 minute summer	SW7	8.000	SW8	49.9	3.213	0.331	0.1818	
720 minute winter	SW9	1.004	SW12	3.0	0.667	0.186	0.0276	
15 minute summer	SW10	4.000	SW11	0.0	0.000	0.000	0.0246	
240 minute winter	SW100	10.000	SW101	-1.9	-0.106	-0.097	0.4501	
240 minute winter	SW101	10.001	SW34	1.1	0.897	0.027	0.0120	
240 minute winter	SW34	10.002	SW35	1.1	0.983	0.031	0.0287	
240 minute winter	SW35	10.003	SW11	1.1	1.199	0.019	0.0057	
15 minute summer	SW11	4.001	SW12	35.5	1.912	0.423	0.2293	
15 minute summer	SW12	1.005	SW13	95.4	1.770	0.670	1.2697	
15 minute summer	SW13	1.006	SW14	108.7	2.573	0.277	0.9382	
15 minute summer	SW14	1.007	SW15	129.3	2.916	0.352	1.0764	
2880 minute winter	SW43	6.000	SW15	0.2	0.006	0.006	0.4784	
2880 minute winter	SW15	1.008	SW16	7.3	0.702	0.046	0.7156	
2880 minute winter	SW16	Flow through Pond	SW17	-7.2	0.004	-0.001	287.1335	
5760 minute summer	SW17	Hydro-Brake®	HW	2.6				1057.6



Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 92.76%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
15 minute summer	HW	1	83.120	0.000	2.1	0.0000	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	DS Node	Outflow (l/s)	Velocity (m/s)	Flow/Cap	Link Vol (m³)	Discharge Vol (m³)

APPENDIX D – MANAGEMENT & MAINTENANCE REGIME

The management and maintenance of the SW drainage system is essentially split into 2 categories:-

It has been agreed with the adjoining landowner/developer, Macar Homes, that they will remain responsible for maintaining all development elements until they are transferred to a Management Company.

1. The Management Company are responsible for all plot shared drainage, manholes, plastic inspection chambers and shared permeable paving.
2. The Freeholders are generally responsible for on-plot parking/hardstanding areas, on-plot drainage, and permeable paving on private drives.

The Management Company

Handover to the Management Company coincides with the completion of the final residential unit.

The Management Company employs a specialist Managing Agent to manage the development which includes all aspects of maintenance.

At handover, the Management Company and Managing Agent receive as-built information together with operating and maintenance manuals that detail all maintenance protocols.

Approximately after 1 year of completion of the final unit, the residents will be invited to elect members to become directors of the Management Company, the Macar appointed directors at that time resign from the Management Company to be replaced by the elected representatives of the residents.

To ensure continuity and a full understanding of the development, operation and maintenance of its various components, the representative of the Managing Agent remains as a director of the Management Company and the appointment of the Managing Agents is fixed for a minimum period of two years following the date of resignation of the last Macar director.

After two years, the Management Company have the right to re-tender the Managing Agent services.

Within the first two years from the final unit completion of the development, the residents have two ways in which they can report any defects and problems, which would include flooding, and that is either to Macar Homes Aftersales department or to the Managing Agents, the residents are issued with telephone numbers for both, which include out of hours emergency response. After two years, Macar Aftersales contacts are normally replaced by members of the Management Company. Therefore, the residents can contact them or the Managing Agents, which then remains through the life of the development.

The Freeholders

Handover to the Freeholders coincides with completion and sale of each respective residential unit. At handover the Freeholders will receive as built information together with (where applicable) operating and maintenance manuals which detail all maintenance protocols.

Surface and Foul Water drainage (by Management Company)

The Management Company will be responsible for maintaining those private sewers that reside outside of a Freeholder's individual responsibility.

The following measures are to be undertaken to ensure the longevity of the surface water drainage system;

Every 6 months

- Remove silt build up from **all** catchpits and manholes. Items to be observed and cleared are high levels of grit, leaves and other such detritus. The main aim of these inspections will be to prevent siltation, which, if allowed to develop will reduce the effectiveness of the system.

Annually

- Select approx. 20% of the development's surface water inspection chambers (situated in accessible non-private areas) and inspect for blockages / silt build up. Remove silt and debris. Rotate on a 5 yearly cycle to cover all such chambers over this period.

Every 2-5 years (depending on outcome of aforementioned inspections)

- Commission a CCTV survey and report on condition of the surface water piped drainage system upstream of the infiltration pond to check for structural integrity and hydraulic fluidity. Carry out promptly any remedial work as advised by CCTV company.
-

Permeable Paving (by Management Company)

Where suitable, some private shared and individual drives are to be constructed of permeable block paving. This approach serves to;

- a) Delay the surface water run-off from these areas, into the ground below, and
- b) Enhance the quality of the rainwater percolating through the granular subbase before discharging into a sewer and any downstream receptor.

The Freeholders (individual drives) and Management Company (shared drives and roads) will ensure that the following measures are undertaken to ensure the longevity of the pervious pavement;

Quarterly

- Inspect the pervious pavement for signs of ponding and ensure there is no migration of soils from adjacent landscaped areas or other deleterious material that may prematurely clog up the jointing stone situated in the gaps between the blocks. Ideally this type of inspection should be undertaken immediately following a heavy rainfall event.
- Commission vacuum sweeping and brushing of the pervious pavement to ensure joints are kept free of silt. Minimum 3 sweeping per year, thus;
 - a) End of Winter (April) – to collect winter debris
 - b) Mid-Summer (July/August) – to collect dust, flower and grass-type deposits.

c) After Autumn leaf fall (November)

The company commissioned to carry out this work should ensure that their vacuum equipment is adjusted accordingly to avoid removal of jointing material. Any lost material should be replaced promptly to avoid the blocks from being dislodged.

Last Resort Remedial Action

- Should a portion of the pervious pavement become substantially impervious due to excessive siltation, the following procedure should be followed;
 - a) Lift block paving and laying course
 - b) Break out underlying bitmac base layer and replace with similar compacted depth of course aggregate subbase material to BS EN 13242:2002 Type 4/20, wrapped in geotextile as Terram 1000 or similar.
 - c) Renew laying course, replace blocks and renew jointing material

NB. Material removed from the voids or the layers below the surface may contain heavy metals and hydrocarbons and as such may need to be disposed of as 'controlled waste'. Sediment testing should be carried out before disposal to confirm its classification and appropriate disposal methods.

Cellular storage tank(by Management Company)

The principle means of surface water attenuation/disposal from the development is by way of cellular soakaways storage.

The Management Company will ensure that the following measures are undertaken to ensure the longevity of the surface water drainage system;

Inspections to identify any areas not operating correctly, pollution, blocked inlets or outlets, standing water etc.

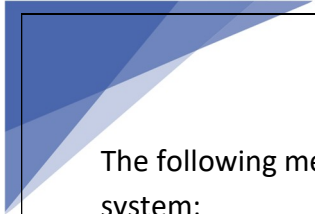
Collect and remove from site all extraneous rubbish that is detrimental to the operation or detract from the appearance of the site, including paper, bottles, cans and similar debris.

Control Chamber (by Management Company)

A system of regular inspections should be established, initially these inspections should be carried out in October and March, however, this may be modified to suit observations over time. Items to be observed and cleared are high levels of grit, leaves and other such detritus. The main aim of these inspections will be to prevent siltation of the system, which, if allowed to develop may reduce the effectiveness of the system by clogging the soakage medium.

All inlets into the chamber and the well head should be checked to ensure unimpeded flow, with the emphasis being on the removal of any silt/detritus build up within the chamber.

Headwalls (by Management Company part of 30 dwelling scheme together with this three housing scheme)



The following measures are to be undertaken to ensure the longevity of the surface water drainage system;

Initially the headwalls shall be inspected on a monthly basis. All extraneous material such as litter and rubble be removed and cleared. After this initial three months the Headwalls themselves are to be checked for structural integrity on a six monthly inspection and any issues made good as per the original design drawings. Ensure water flows freely by removal of vegetation and siltation as necessary.

Ordinary watercourse maintenance under riparian responsibility (by Management Company as part of the 30-dwelling scheme and this three-dwelling scheme)

The Management Company will undertake the following measures to ensure the longevity of the ordinary watercourse system:

Regular maintenance

Monthly or as required

- i) Remove litter (including leaf litter) and debris.
- ii) Cut grass- to retain grass height within specified design range.
- iii) Manage other vegetation and remove nuisance plants
- iv) Inspect inlets, outlets and overflow for blockages and clear if required.



Occasional maintenance as required

- i) Remove or control tree roots where they encroach into the ordinary watercourse.

5 years or as required

- i) In the event of complete blockage, excavate and remove sediment build-up, re-level uneven surfaces and reinstate the ordinary watercourse to the design levels.